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09/834,389	04/13/2001	Jerrold E. Franklin	3737.02-1	3452

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EXAMINER	
CANTELMO, GREGG	
ART UNIT	**PAPER NUMBER**
1745	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/834,389	FRANKLIN ET AL.	
	Examiner	Art Unit	
	Gregg Cantelmo	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-18,20 and 22-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-18,20 and 22-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the amendment received February 21, 2007:

   a. Claims 2-18, 20 and 22-37 are pending;

   b. The previous drawing objections and 112 rejections are withdrawn in light of the amendment and Applicant's rebuttal.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 2-11, 14-17, 20, 22-31 and 33-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,087,033 (Grune) in view of U.S. Patent No. 6,207,310 (Wilson).

Grune discloses in Fig. 2 of a fuel cell comprising a bipolar separator 26; a flexible membrane electrode assembly (22/24/26); a manifold (31,37); and a securing member 28 that secures the edge portion of the separator plate by crimping, bending or rolling over of the securing member over the membrane electrode assembly, i.e. MEA (see Fig. 2 and col. 4, ll. 55-56 as applied to claims 2 and 23). The edge is either continuous or discontinuous (as applied to claim 20 and 37).

The module is then provided in a fuel cell stack (Fig. as applied to claims 3 and 24).

The separator plate is a metal (col. 5, ll. 10-15 as applied to claims 5 and 25).

The separator plate is a square configuration (Fig. 3 and col. 6. ll. 10-15 as applied to claims 7 and 27).

There are at least four manifolds 31, 37, 35 and 36 provided (as applied to claims 16 and 35). These manifolds, or pole flanges as called by Grune are of a metallic material (col. 5, ll. 10-30 as applied to claims 14 and 33) and have passages for either a single reactant or multiple reactants (Figs. and col. 9, ll. 15-20 as applied to claims 17 and 36). The manifolds are disposed through the separator plates and MEA and thus

are comprised of plastic materials, a composite material or a metallic material (Fig. 6 as applied to claims 14 and 33). Each manifold itself constitutes a single discrete manifold (as applied to claims 15 and 34).

Grune does not expressly disclose: a seal, adhesive or gasket to seal the separator and membrane electrode assembly (claims 2 and 23); a bond interposed between the manifold and the separator plate, wherein the bond affixes the manifold to the separator plate (claims 2, 4 and 23); of an adhesive bond interposed between the manifolds and the BSP(claim 4); the separator plate having a thickness between about 0.0001 inch (0.000025 cm) and about 0.500 inch (1.25 cm) and area of between 0.1 inches square (0.0625 cm square) and 5000 inches square (31,250 cm square} (claims 6 and 26); the adhesive, seal or gasket is applied to the separator and MEA as a single unit (claims 8 and 27); wherein the seal is a gasket (claims 9 and 29); wherein the gasket is a foam gasket (claims 10, 22 and 30); wherein the adhesive, gasket or seal is part of the reactant flow field (claims 11 and 31).

With respect to the seal, adhesive or gasket of claims 2, 8-10, 23, and 27-30:

However, Wilson teaches that it is conventional to employ adhesive coated gaskets to provide additional sealing between components of the fuel cell structure (claims 2, 8-9, 23, 27-29). See column 6, lines 1-10. Wilson is also concerned with silicon foam gaskets that are easily compressed to provide a gas-tight seal, yet not require excessive force to accomplish an effective seal; this supplies substantial leeway in matching the seal thickness with the thickness of the compressed cell (claims 10 & 30). See column 8, lines 30-35.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the adhesive coated gasket of Wilson, in the fuel cell of Grune, since it would have improved the systems resistance to reactant/oxidant leakage. Furthermore, the gaskets of Wilson are easily compressed to provide a gas-tight seal, yet not require excessive force to accomplish an effective seal; this supplies substantial leeway in matching the seal thickness with the thickness of the compressed cell. This arrangement will provide a bond between the manifold and separator that affixes the manifold to the separator forming a single unit.

With respect to the thickness requirements of claims 6 and 26:

It would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the instant dimensions, as minimizing separator plate thickness lowers stack weight, volume, and cost of materials, with a concomitant increase in the fuel cell power density (See Wilson at column 2, liens 54-60). Furthermore, optimization of separator thickness and area would have been obvious, since such modifications would involve mere changes in size of the separator. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

With respect to and adhesive interposed between the manifolds and BSP (Claim 4) and of the adhesive bond, seal or gasket forming part of the reactant flow field (claims 11 and 31):

According to Wilson, in another embodiment, the gaskets are replaced by thin, rigid plastic frames coated with adhesive for sealing (col. 6, ll. 1-10 as applied to claim

4). In providing this arrangement the bonding material is a component of the reactant flow field of the BSP at the point where the reactant is introduced from the manifolds into the BSP (as applied to claims 11 and 31).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Grune by providing an adhesive as taught by Wilson is that it would have provided an equivalent means for sealing the reactant flows of the fuel cell and the use of adhesives would have expectedly improved the seal.

3. Claims 12-13 and 32 rejected under 35 U.S.C. 103(a) as being unpatentable over Grune in view of Wilson as applied to claims 2 and 23 above, and further in view of JP 03-049160 (JP '160).

The differences not yet discussed are of the manifold being an external manifold (claim 12), bonding the manifold to the BSP (claims 13 and 32).

JP '160 discloses providing external manifolds (Figs as applied to claim 12) wherein the manifolds are bonded to the separator plates (abstract as applied to claims 13 and 32).

Use of both internal and external manifold systems are extremely well known in the art and while Grune does not teach of using an external manifold system, such a modification would have been within the requisite skill of the ordinary worker in the art as an equivalent means for providing reactant to the fuel cell stack.

Upon using an external manifold array it would have furthermore been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the

teachings of Grune in view of Wilson to bond the manifolds to the separators to which the reactants are provided since it would have improved the seal between the flow fields and manifolds and prevented leaking of reactants.

4. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grune in view of Wilson as applied to claim 2 above, and further in view of U.S. Patent No. 6,080,503 (Schmid).

The difference not yet discussed is the bond between the manifold and MEA comprising a plastic, elastomeric, metallic or foam material (claim 18).

The combination above suggests providing manifolds adjacent to MEAs in a fuel cell but fails to clearly teach of providing a bond between the two of the materials recited in claim 18.

Use of various bonding materials to improve bonding and sealing between adjacent components in a fuel cell and fuel cell stack is well know in the art to provide improved bonding and sealing and prevent leakage of reactants from the reactant flow paths (see Schmid col. 4, ll. 1-10).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Grune in view of Wilson by using a bonding material between the MEA and manifold to improve bonding and sealing between adjacent components in a fuel cell and fuel cell stack and prevent leakage of reactants from the reactant flow paths.

Response to Arguments

5. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Gregg Cantelmo
Primary Examiner
Art Unit 1745

gc
May 13, 2007